

WHAT IS CLAIMED IS:

- 1                   1.       A battery pack for use with a portable electric power tool,  
2       comprising:  
3                   a plastic housing having a floor, a circumferential wall extending  
4       upward from an outer peripheral edge of the floor and a cap cooperating with an  
5       upper outer peripheral region of the circumferential wall to define an enclosed  
6       internal cavity;  
7                   a relatively soft elastic bumper mounted to the plastic housing and  
8       extending about the outer peripheral edge of the floor, and overlying adjacent  
9       portions of the floor and circumferential wall; and  
10                  a plurality of battery cells mounted within the enclosed internal cavity  
11       of the plastic housing;  
12                  wherein the elastic bumper serves to cushion an impact load exerted  
13       on the battery pack and the associated power tool if the battery pack or the electric  
14       power tool and battery pack assembly is dropped in an orientation in which the  
15       battery pack strikes a hard surface.
- 1                   2.       The battery pack of claim 1 wherein the elastic bumper is  
2       over-molded onto the plastic housing.
- 1                   3.       The battery pack of claim 1 wherein the housing floor and the  
2       housing circumferential wall are formed from an injection molding process, and the  
3       elastic bumper is co-molded therewith.
- 1                   4.       The battery pack of claim 1 wherein the elastic bumper is  
2       mechanically interlocked with the plastic housing.
- 1                   5.       The battery pack of claim 1 wherein the plastic housing  
2       includes at least one aperture formed therethrough for receiving a projection of the  
3       elastic bumper for mechanically interlocking the elastic bumper thereto.

- 1                   6.     The battery pack of claim 1 wherein the elastic bumper is  
2     affixed to the plastic housing by an adhesive applied therebetween.
- 1                   7.     The battery pack of claim 1 wherein the elastic bumper is  
2     secured to the plastic housing by a frictional fit therebetween.
- 1                   8.     The battery pack of claim 1 wherein the plastic housing  
2     includes a plurality of external ribs for frictional engagement with the elastic  
3     bumper.
- 1                   9.     The battery pack of claim 1 wherein a liquid elastomeric  
2     material is sprayed onto the plastic housing to form the elastic bumper.
- 1                   10.    The battery pack of claim 1 wherein the plastic housing is  
2     dipped into a liquid elastomeric material to form the elastic bumper.
- 1                   11.    The battery pack of claim 1 wherein the elastic bumper is  
2     separately formed and fastened to the outer peripheral edge of the plastic housing.
- 1                   12.    The battery pack of claim 1 wherein the elastic bumper has  
2     a nominal wall thickness of 0.3 millimeters to four times a nominal wall thickness  
3     of the plastic housing.
- 1                   13.    The battery pack of claim 1 wherein the elastic bumper has  
2     a nominal wall thickness of 0.75 millimeters to 2 millimeters.
- 1                   14.    The battery pack of claim 1 wherein the elastic bumper has  
2     a durometer of 20 Shore O to 80 Shore A.
- 1                   15.    The battery pack of claim 1 wherein the elastic bumper has  
2     a durometer of 20 Shore A to 75 Shore A.

1                    16.    The battery pack of claim 1 wherein the elastic bumper has  
2 a static coefficient of friction of 0.5 or greater when cooperating with a smooth, dry  
3 planar glass reference surface.

1                    17.    The battery pack of claim 1 further comprising an internal  
2 annular elastic member suspending the battery cells within the enclosed internal  
3 cavity of the plastic housing.

1                    18.    The battery pack of claim 17 wherein the annular elastic  
2 member has a durometer of 20 Shore O to 80 Shore A and a nominal radial  
3 thickness of 0.3 millimeters to four times a nominal wall thickness of the plastic  
4 housing.

1                    19.    The battery pack of claim 1 wherein the plastic housing is  
2 provided with at least one spring biased latch, which locks the battery pack and the  
3 power tool in an assembled state; and  
4                    wherein at least a portion of the elastic bumper is oriented proximate  
5 to the latch.

1                    20.    The battery pack of claim 19 wherein the latch projects from  
2 the housing a predefined distance when the spring is compressed, and the at least a  
3 portion of the elastic bumper has a thickness that is greater than the predefined  
4 distance.

1                    21.    The battery pack of claim 1 wherein the cap is provided with  
2 a tapered guide-way for releasably receiving a cooperating mounting flange on the  
3 power tool, when a power tool is moved relative to the battery pack, along a  
4 longitudinal axis which is generally parallel to the floor of the battery pack.

1                    22.    The battery pack of claim 21 wherein the tapered guide-way  
2 tapers in both a transverse and vertical direction to accommodate a slight mis-  
3 alignment of the power tool and battery pack during assembly.

1                   23.     The battery pack of claim 22 wherein the cap of the battery  
2     pack is provided with a spring biased latch, which locks the battery pack and the  
3     power tool in an assembled state, wherein the spring biased latch has a latch force  
4     during assembly which is less than the static frictional force exerted by the battery  
5     pack when placed upon a smooth dry planar horizontal glass reference surface,  
6     thereby enabling a user to install the battery pack while placed on a horizontal  
7     surface onto the power tool using one hand.

1                   24.     The battery pack of claim 23 wherein the guide-way tapers  
2     1° to 25° transversely relative to a central longitudinal axis parallel to the floor.

1                   25.     The battery pack of claim 23 wherein the guide-way tapers  
2     1° to 25° vertically relative to a central longitudinal axis parallel to the floor.

1                   26.     A battery pack for use with a portable electric power tool,  
2     comprising:  
3                   a plastic housing having a floor, a circumferential wall extending  
4     upward from an outer peripheral edge of the floor and a cap cooperating with an  
5     upper outer peripheral region of the circumferential wall to define an enclosed  
6     internal cavity;  
7                   a relatively soft elastic bumper mounted externally to the plastic  
8     housing; and  
9                   a plurality of battery cells mounted within the enclosed internal cavity  
10     of the plastic housing;  
11                  at least one spring biased latch, which locks the battery pack and the  
12     power tool in an assembled state;  
13                  wherein at least a portion of the elastic bumper is oriented proximate  
14     to the latch and the elastic bumper serves to cushion an impact load exerted on the  
15     battery pack and the associated power tool if the battery pack or the electric power  
16     tool and battery pack assembly is dropped in an orientation in which the battery pack  
17     strikes a hard surface.

1                    27.     The battery pack of claim 26 wherein the elastic bumper is  
2     mounted to the plastic housing floor.

1                    28.     The battery pack of claim 26 wherein the elastic bumper  
2     overlies portions of the floor and circumferential wall.

1                    29.     The battery pack of claim 26 wherein the elastic bumper  
2     extends about the outer peripheral edge of the floor.